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Localizing the SDGs through tailored-based training solutions targeting students and academics

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Abstract. This paper focuses on understanding, education, and knowledge gaps on topics related to sustainable development such as urban metabolism, responsible use of natural resources, and the United Nations Sustainable Development Goals (SDGs). This work is part of a broader study that aims at disseminating education on topics at all level of societies, including minority groups such as children, elderly, persons with disabilities, students and academics, women, LGBTI+, and homeless and refugees. The current study tackles students and academics specifically and illustrates the relationship between cultural background (country and continent of origin) and perceptions of sustainable development and politics at the local level. For this analysis, data were analysed and collected at the Politecnico di Milano, Milan (Italy) using structured interviews and survey questionnaires. Findings provide a deeper understanding of students and academic sensitivities of SDGs and local political system spatial patterns by continent across the world.

1. Introduction

Today, more than ever, understanding the interests and needs of people overlap with city priorities and building coalitions of diverse stakeholders to strengthen the social fabric is key. Listening and responding to citizens needs can help deliver different, but equally important, dimensions of development. For instance, policies meant to advance progress on climate change must simultaneously address inequalities and help create peaceful, just, and inclusive societies. This study was developed through a collaboration between the Department of Architecture and Urban Studies at Politecnico di Milano, Milan (Italy) and Metabolism of Cities, a non-profit organization (NPO) based in Brussels (Belgium) and centered around urban metabolism studies to develop awareness on localizing the United Nations Sustainable Development Goals (SDGs).

The study aim is composed of three sections: (i) introduction of the problem; analysis of the underrepresented populations of students and academics, (ii) research analysis, and (iii) policy recommendations for future research.

2. Literature review

2.1. Youth, academics, and the SDGs

With political divisions on the rise and global cooperation imperilled, city officials worldwide are stepping up to lead by solving local problems while sharing solutions and innovations across borders [1]. Driven by the need to act locally while thinking globally [2], a growing number of urban areas are



adapting the United Nations Sustainable Development Goals (SDGs) as a blueprint for progress. The 17 SDGs can help cities tackle local social, economic, and environmental challenges vital to the health and wellbeing of their residents by 2030 [3]. With their emphasis on metrics and results, the SDGs push cities to communicate their progress on their priorities to their citizens. Yet, as a globally agreed framework, they also provide a common language to share solutions, best practices, and innovations with a wide array of counterparts [4].

The SDGs represent an agenda that aligns with the local goals of cities around the world while offering the opportunity to speak in a common language and showcase innovation, pragmatism, and values to drive global progress. SDG targets and metrics provide a basis for helping cities address social tough issues like homelessness, affordability, resource consumption, health and educational outcomes, mobilizing policy, and resources that take into account social and human development. The UN 'leave no one behind' motto advocates cities to measure themselves against other communities (most vulnerable target) using a holistic vision approach of sustainable development. The SDGs give city officials, stakeholders, and residents alike a common and immediate frame of reference when engaging counterparts.

Today, the world is home to the largest generation of young people in history, 1.8 billion. Close to 90% of them live in developing countries, where they compose a large quantity of the population [7]. Connected to each other like never before, young people want to and already contribute to the resilience of their own communities, proposing innovative solutions, driving social progress and advocating for political change, in urban and rural regions. Henceforth, young people are essential to world peace and improving the political agenda that drive change. In addition, youth constitute a tremendous and essential asset worth investing in, opening the door towards a domino effect and influence the next generation of activist around the world. Thus, recognising youth as right holders, and promoters towards facilitating transparency, accountability, and responsiveness from stakeholders toward young people is key towards localizing the SDGs by 2030. According to the United Nations, World Youth Report, the active engagement of youth in sustainable development efforts is central to achieving sustainable, inclusive, and stable societies by the target date, and to averting the worst threats and challenges to sustainable development, including the impacts of climate change, unemployment, poverty, gender inequality, conflict, and migration [8]. Since 2015, a number of youth and academic organizations have been developed across the world since the Paris Agreement. The United Nations Young Leaders powered by the Office of the UN Secretary Generals program allows youth to advocate towards localizing the SDGs. Some objectives includes advocating for the goals, in ways most accessible and relatable to young people across different contexts; promoting innovative ways of engaging their audiences and peers in the advocacy and realization of the goals; and contributing to a brain trust of young leaders supporting the UN and partners for key moments and initiatives related to the Goals [9].

2.2. Students and Academics: advocating towards changing the world

It is fundamental for young people to contribute towards the achievement of the SDGs and Agenda 2030. Many of the global development challenges are especially relevant for academics and youth. Further tools and advocacy are needed to drive force, but only if they are provided with skills and opportunities needed to reach their potential, support development, and contribute to peace and security building. As part of 'leave no one behind,' motto economic citizenship is a significant factor in the fight to eradicate poverty and reduce inequalities globally. Meeting the Agenda 2030 across youth and academics relies not only on setting goals, but also on a responsive approach to the voice and needs. However, in order to incorporate young people with skills, knowledge, and confidence in their abilities, there is a real chance that global leaders can harness the potential of young people to reach the SDGs. In order to do so, more studies are needed on the concerns and needs of youth across campuses to fully comprehend whether students and academics are educationally equipped. The next section, provides a campus-wide study that was conducted at Politecnico di Milano in Milan, Italy with an attempt to develop a link between students and academics, the SDGs, and economic citizenship.

3. Methods

Politecnico di Milano (POLIMI), in Milan, Italy was chosen for this study to understand whether students and academics had received basic education on resource use and urban metabolism. Participation included a total sample size of 54 students and academics aged 18 and older from around the world. Participants were opportunistically recruited during campus-wide events, such as conferences, seminars, and exhibitions. Interviewees constituted a reasonable sample of individuals which resulted in a satisfactory degree of diversity in the survey responses. However, it is important to notice that respondents were not randomly sampled and, therefore, the outcomes reported below might not be representative of the total number of international students and academics.

Structured interviews and surveys were conducted over a 12-week period in the months between May and July, 2017. They consisted with a total of 9 questions, where 8 were open-ended questions and 1 rate question (with 1 being the lowest value and 5 the highest) (See Table 1). These were to assess (i) participant's understanding of urban metabolism and related methodologies, (ii) perception of SDGs achievement in local-based contexts, (iii) perception of transparency and accountability of local political systems, and (iv) participant's suggestions and comments to improve sustainable solutions locally. The number of questions were directed in English and Italian language by the interviewers (Figure 1).

Table 1. Interview and survey questionnaire.

	Questions
Background information	Q1. What country, continent are you from?
Understanding of urban metabolism and related methodologies	Q2. How would you define the concept of urban metabolism (i.e. materials, energy, people and information)?* Q3. What is the most efficient methodology to apply and evaluate city resources?*
Perception of SDGs achievement in local-based contexts	Q4. Which is the most important SDG target for your city? Q5. Which is the least important SDG target in your city?
Perception of transparency and accountability of local political systems	Q6. If you can describe your city political system in one word which will it be? Q7. Corruption in your city government level 1, 2, 3, 4, 5? (with 5 being high)
Suggestions for improving sustainable solutions locally	Q8. What can your city or you do to achieve the SDGs you selected as most important? Q9. Besides recycling and raising prices on materials how can cities better manage their natural resources?

*These questions are not reported in this analysis



Figure 1. Photographs of participants.

4. Results

4.1. Background information

Table 2 reports descriptive statistics for the total number of students and academics found in Q1. Responses are reported by continent, while participants' countries of origin are highlighted on the following maps (Figure 2-3). Interviewees were dispersed amongst 5 continents including Asia, Europe, North America, South America, and Africa. However, the sample size varied drastically between continents. For instance, Table 2 shows that Europe was the most represented continent covering more than half of the study's participants (53.7%), while North America received the least representation (3.7%).

Table 2. Responses on continent of origin (n=54)^a.

Continent of origin	Sample size (%)
Asia	24.1
Europe	53.7
North America	3.7
South America	11.1
Africa	7.4
Total	100

^a Responses to Q1 are statistically reported by continent

4.2. Perception of SDGs achievement in local-based contexts

The following analysis provides deeper understanding of perceptions of SDGs and local political systems by continent. It is in the scope of this work to explore whether there are common patterns amongst student and academic participants from a selected continent and how these patterns differ across continents. Hence, it is important to notice that the setting and cultural framework in which the survey took place are not representative of the entire world population and recorded discrepancies in the number of respondents per continent.

4.2.1. Perception of the most important SDG target for the city of origin. Results from Q4 showed relevant differences in the cross-continent analysis (Figure 2). Amongst respondents from Europe, the relative majority (28.1%) reported that SDG11 was the most important target for their cities. Following, 12.5% of respondents mentioned SDG8, 9.4% mentioned SDG12, and another 9.4% SDG15. Other SDGs that were reported amongst the most important included in order of relevance: SDG4, SDG5, SDG10, SDG14, SDG1, SDG7, SDG9, SDG13, and SDG16.

The most important targets for Asian respondents were SDG7 and SDG16, each mentioned by 22.2% of the survey respondents. Secondly, 11.1% of Asian respondents mentioned respectively SDG4, SDG5, SDG6, SDG11, and SDG17.

Amongst African respondents, 22.2% reported that the most important targets for their city were SDG1, SDG6, and SDG8, respectively. Secondary targets mentioned by 11.1% of respondents included: SDG2, SDG3, and SDG5.

Respondents from South America were equally divided between SDG10 and SDG11, each mentioned by 50.0% of respondents.

Finally, respondents from North America were equally divided between SDG6, SDG10, SDG16, and SDG17, each mentioned by 25.0% of respondents.

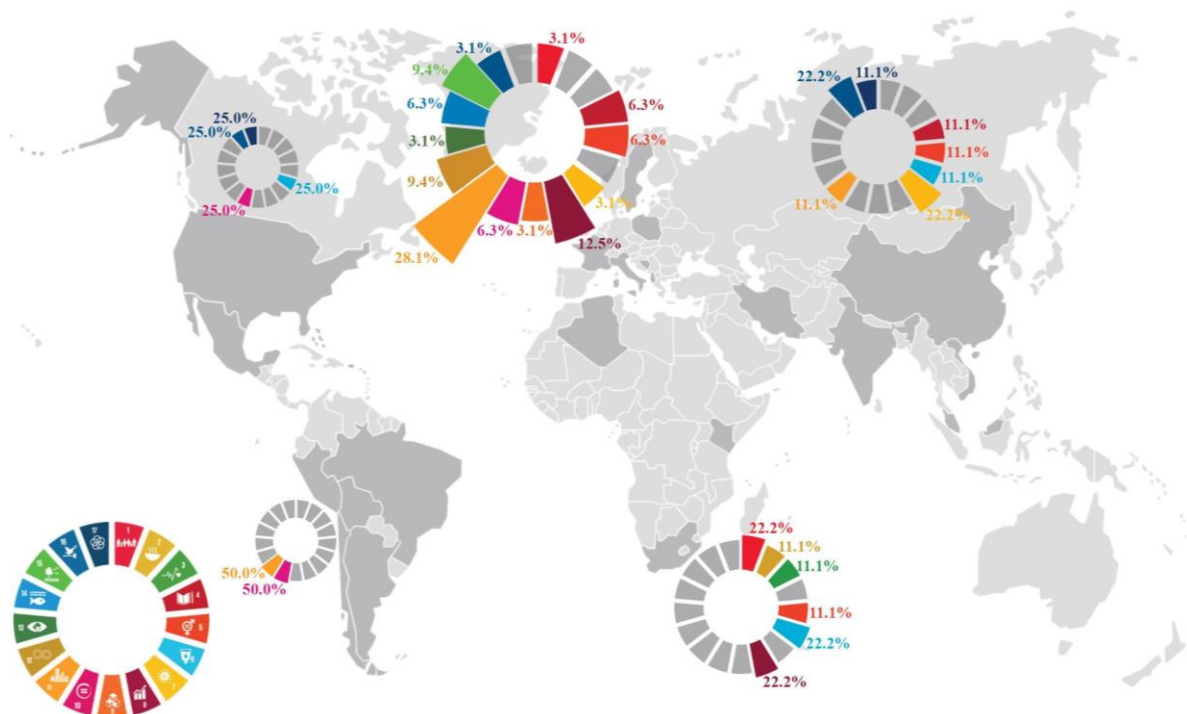


Figure 2. Perception of the most important SDG target for the city of origin (n=54).

4.2.2. Perception of the least important SDG target for the city of origin. Results from Q5 shows relevant differences in the cross-continent analysis (Figure 3). Out of the total respondents from Europe, the relative majority (40.9%) said that SDG14 was the least important target for their cities. Secondly,

18.2% reported that SDG2 was not an important target. Quite surprisingly, 9.1% respondents mentioned that SDG11 was one least important target by raising controversy with the previous section. Respectively, 4.5% of the respondents mentioned for this question each of the following SDGs: SDG3, SDG5, SDG7, SDG8, SDG9, SDG12, and SDG17.

Amongst Asian respondents, more than half (60.0%) reported that SDG2 was the least important target in their cities. Other targets reported as less important were SDG3 and SDG9, each mentioned by 20.0% of respondents.

Respondents from Africa were equally divided between SDG5 and SDG7, each considered the least important by 50.0% of interviewees.

The majority of South American respondents (66.7%) said that SDG17 was the least important target for their cities, while 1 in 3 mentioned SDG14.

Finally, amongst North Americans, responses on the least important target were equally divided between SDG6, SDG9, and SDG15, each mentioned by 33.3% of respondents.

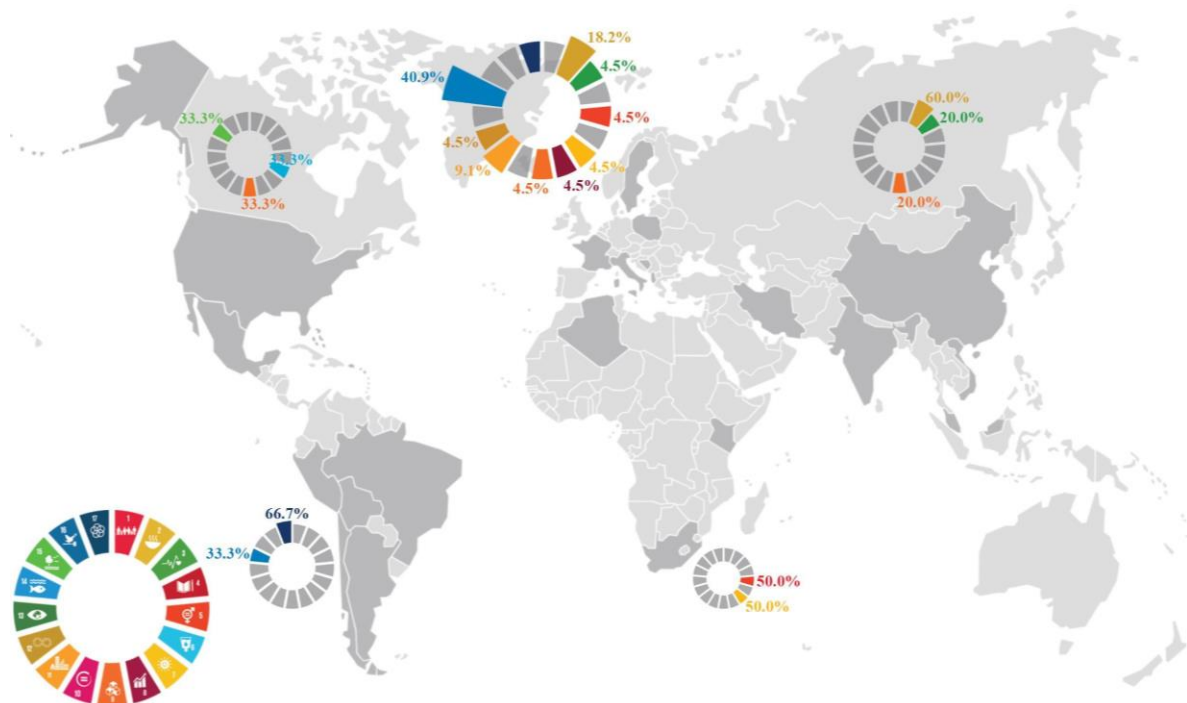


Figure 3. Perception of the least important SDG target for the city of origin (n=54).

4.3. Perception of transparency and accountability of local political systems

The next section outlines perceptions about local political systems divided by continent. Figure 4 reports combined result from Q6 and Q7.

4.3.1. City political system. Results from Q6 show that Europe is the only continent for which the majority of respondents (55.5%) said they had a positive perception of the political system of their cities. From the survey, some connotations that were used to describe local politics were: “progressive,” “sustainable” or “innovative.” However, some biases could stem from Europe being the most represented continent in this analysis.

For all other continents, the absolute majority of respondents mentioned that they had negative perceptions of political systems in their cities: 66.7% of Asians said that local governments were “unjust,” “corrupted” or “messed up;” 100.0% of African respondents said that local governments were “corrupted” or “inefficient;” 85.7% of South Americans reported local governments as “corrupted” or

“fragmented;” and 100.0% of North American respondents said that local governments were “corrupted” or “unpredictable.”

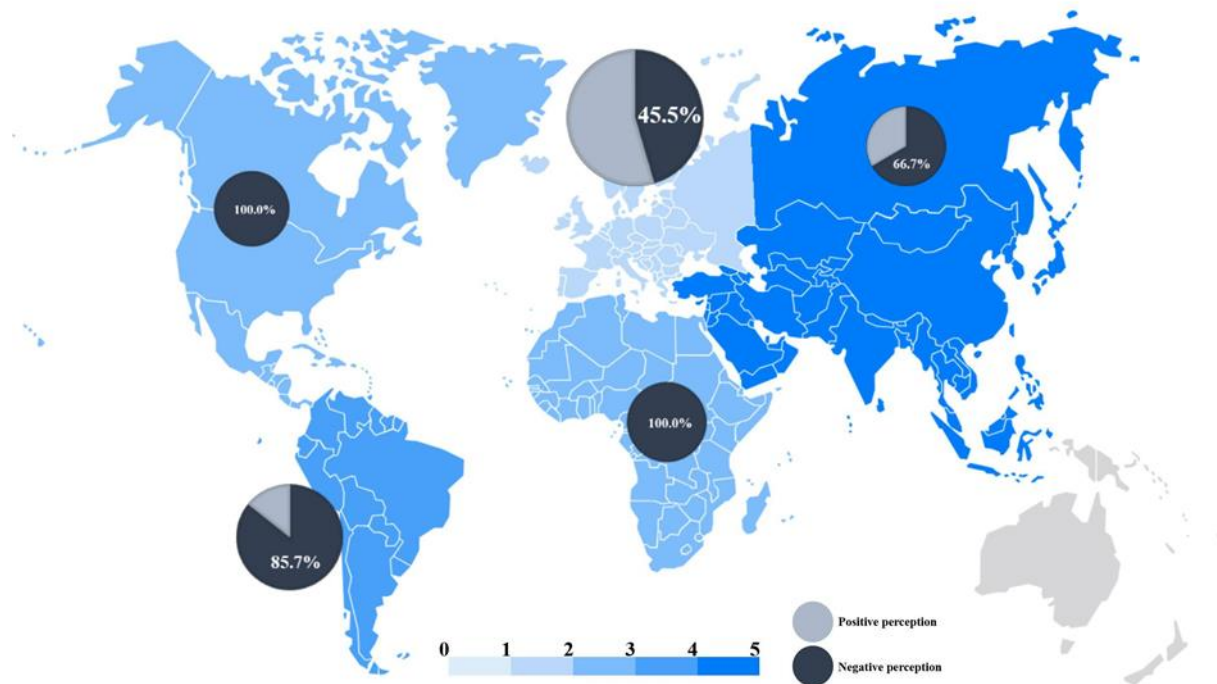


Figure 4. Perception of transparency and accountability of local political systems (n=54).

4.3.2. Corruption level in the city government. Responses to Q7 are graphically reported in Figure 4. Corruption was classified according to 5 levels, with 1 being “marginally corrupted” and 5 “very corrupted.” Similarly to previous analysis, the relative majority (37.5%) of respondents from Europe reported that they perceived level 2 corruption in their cities.

The relative majority of Asian respondents (30.0%) reported that they perceived level 4 and level 5 corruption, respectively. As shown in Figure 4, Asia was the continent with the highest perceived corruption.

Responses across African respondents ranged from level 2 corruption, to level 4, to level 5, each mentioned respectively by 33.3% of interviewees.

The majority of respondents from South America (66.7%) reported a perceived level 4 corruption in their city.

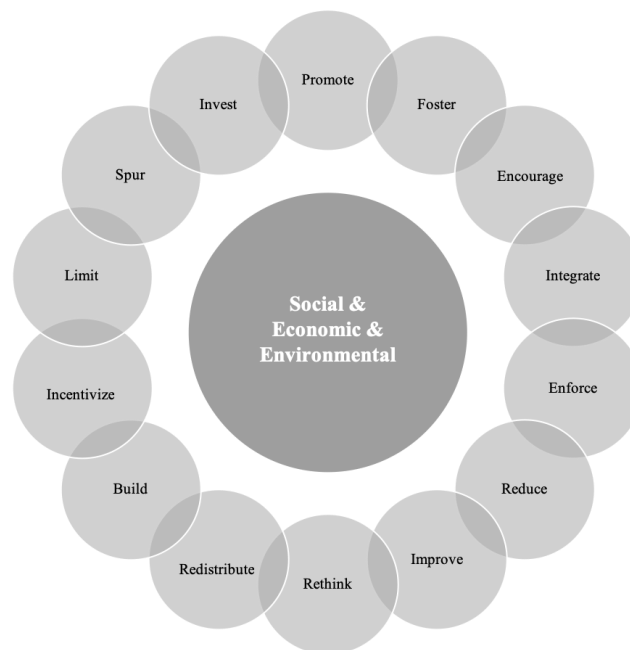
Finally, North American respondents were equally divided between level 2 and level 5 corruption, each mentioned by 50.0% of interviewees.

4.4. Suggestions for improving sustainable solutions locally

Results from Q8 and Q9 are reported in Table 3 and Figure 5, which shows a number policy recommendations that were provided by students and academics from across all surveyed continents. For the purpose of this analysis, recommendations were coded and categorized into three thematic areas (social, economic, and environmental) instead of following the continent division from the previous sections. Keywords that arose from this analysis includes: promote, foster, integrate, encourage, enforce, reduce, improve, rethink, redistribute, build, incentivize, limit, spur, and invest.

Table 3. Suggestions for improving sustainable solutions locally by thematic area (n=54).

Social	Economic	Environmental
<ul style="list-style-type: none"> ● <u>Promote</u> education on the sustainable use of resources. ● <u>Foster</u> collaboration across cities. ● Promote quality education. ● <u>Integrate</u> education programs on natural resources. ● <u>Encourage</u> more structural organization in local political systems. ● Foster innovation by increasing youth representation in decision making. 	<ul style="list-style-type: none"> ● <u>Enforce</u> industry taxation to limit the use of natural resources. ● <u>Reduce</u> price of recyclables. ● <u>Improve</u> resource management by creating income opportunities. ● <u>Rethink</u> production systems. ● <u>Redistribute</u> power balances within an economic system. ● <u>Build</u> more efficient infrastructures. ● Reduce consumption and production. ● <u>Incentivize</u> consumer responsibility. 	<ul style="list-style-type: none"> ● <u>Limit</u> the use of natural resources. ● Reduce the environmental impact of industrial processes. ● Reduce pollution levels by rethinking transportation systems. ● Improve waste management. ● Promote ecosystem services. ● <u>Spur</u> climate action. ● <u>Invest</u> more on renewable energy sources. ● Encourage industrial feasibility studies of urban mining.

**Figure 5.** Suggestions for improving sustainable solutions locally by keyword (n=54).

5. Conclusion

Far from being mere beneficiaries of the 2030 Agenda, young people and academics have been active architects and designers in its development and continue to be engaged in the frameworks and processes

that support its implementation, follow-up and review. Underlining the realization of targets and world issues under the 17 SDGs is fundamental to overall youth and academic development across the world.

Europe is estimated to hold the highest number of local government transparency score and positive perception and wording, when compared to other continents. The continents differed markedly. Not only is the number of groups different, but also the geographical ranges of the groups do not overlap, respectively. In addition, Europe is the only continent for which the majority of respondents reported they had a positive perception of the political system of their cities. From the survey, some connotations that were used to describe local politics were: “progressive,” “sustainable” or “innovative.” North American respondents said that local governments were “corrupted” or “unpredictable.” Conversely, for Europe, Africa, and Asia data set samples, provided similar traits relating the importance and least importance SDGs. Previous studies have shown that differences among continental groups, in this case students and academics, represent a rather small fraction of global diversity. First, and foremost, the study includes (i) participant’s understanding of urban metabolism and related methodologies, (ii) perception of SDGs achievement in local-based contexts, (iii) perception of transparency and accountability of local political systems, and (iv) participant’s suggestions and comments to improve sustainable solutions locally.

In this study, we found that the majority of developed countries are more likely to trust their government when compared to developing countries, respectively. Our attempt to identify major student and academic groups by clustering continents yielded contradictory results. Different number of groups and different distribution of participants within such groups were observed. Moreover, these results did not align with other similar studies [5]. These observations meant that there is no reason to expect that the same groups will be identified on the basis of different sets of continents with similar SDG importance levels. In addition, we believe that the ethnic or geographic affiliation has a significance based on the education received on SDGs from participants, city engagement, and personal need.

Achieving the Agenda 2030 relies not only on setting goals in cities, but also on a responsive approach to voice and needs of youth and academic. It is through our young people with skills, knowledge, and their abilities, that global leaders can harness the potential of young people to reach the goals set by the SDGs. Youth across continents can work together and learn from each other towards creating a generation of empowered youth and support short and long term sustainable development.

Through the Urban Metabolism and Minority Pulse Campaign, our study seeks to increase diversity in our scholarly community by educating the next generation of rising stars and creative thinkers to help achieve our mission of improving governance across the world by including all members of society [6]. This study specifically focuses on the under representative population of students and academics at POLIMI, Milan, Italy developing a number of surveys, interviews, activities, and seminars. Our aim is to work closely with experts in government, academia and bright minded people from all over the world to come up with new city replicable approaches (sharing results and best practices) that can be shared widely across youth and academic populations. Through economic citizenship, empowerment, and financial capability, our youth can have the opportunity to explore the latest strategic trends, research, and analysis. Economic citizenship has the potential to improve economic and social well-being, increase economic and social engagement, enhance understanding of and respect for basic rights, reduce asset poverty, and lead to sustainable livelihoods for children and youth. Finally, it is recommended for cities to develop a number of practical applications of new technology and research, as well partnerships with universities and businesses which are critical to producing the innovation that the SDGs demand.

Appendix

Sustainable Development Goals glossary (Source: <https://sustainabledevelopment.un.org/sdgs>):

- SDG1: No poverty
- SDG2: Zero Hunger
- SDG3: Good health and well-being
- SDG4: Quality education
- SDG5: Gender equality
- SDG6: Clean water and sanitation

SDG7: Affordable and clean energy
SDG8: Decent work and economic growth
SDG9: Industry, innovation and infrastructure
SDG10: Reduced inequalities
SDG11: Sustainable cities and communities
SDG12: Responsible consumption and production
SDG13: Climate action
SDG14: Life below water
SDG15: Life on land
SDG16: Peace, justice and strong institutions
SDG17: Partnerships for the goals

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